

Appl. No. : 09/456,770
Filed : December 7, 1999

91. The device of Claim 90, said thin, sublimed molecular film being tris(8-quinolinolato) aluminum (III).

92. The device of Claim 90, said organic electroluminescent device further comprising a light-emitting polymer deposited on a transparent anode.

93. The device of Claim 92, said light-emitting polymer being one of the group of poly (p-phenylene vinylene), soluble polythiophene derivatives, or polyanilene.

94. The device of Claim 90, said transparent anode being comprised of a transparent base substrate coated with indium tin oxide.

95. A system for generating an image of a relief object comprising:

an electroluminescent device having an electrode;

an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device so that current coupled from said current source to said relief object is a function of a surface structure of said relief object, whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said relief object and less intense light is generated by areas of said electroluminescent device weakly coupled to said current from said relief object to form an image of the relief object; and

a one-to-one sensor array located such that said generated light is sensed by said one-to-one sensor array.

96. The system of Claim 95, wherein the one-to-one sensor array is in direct contact with the electroluminescent device, and located on a side of the electroluminescent device opposite the relief object.

REMARKS

In the Office Action, the Examiner rejected Claims 47 and 48 under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner further rejected Claims 45, 46 and 64-78 under 35 U.S.C. § 103 as being unpatentable over reference WO 97/16834 to Gaffney ("the Gaffney reference"). The Examiner further rejected Claims 49-63 and 79-95 under 35 U.S.C. § 103(a) as being unpatentable over Derwent abstract XP-002080114, Derwent abstract XP-002080115, and the Abstract of Japanese Patent 02126381.

Appl. No. : 09/456,770
Filed : December 7, 1999

Because of an error in claim numbering in the Preliminary Amendment, Applicant has renumbered Claims 45-47 of the Preliminary Amendment to now be Claims 64-96. Applicant has cancelled Claims 1-63 and thus, claims 64-96 are now pending in this application. Reconsideration of the application is respectfully requested.

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Enclosed is a form PTO-1449 listing two pending applications. While the Applicant do not believe that these references will affect the patentability of the pending claims, Applicant respectfully requests the Examiner to consider the pending claims in connection with these references in order to make the references of record.

REJECTION OF CLAIMS 47 and 48 UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

In rejecting Claims 47 and 48 under 35 U.S.C. § 112, second paragraph, the Examiner indicated that the single electrode language was confusing. While Applicant believes that the language is clear, Applicant has cancelled claims 47 and 48 without prejudice.

REJECTION OF CLAIMS 45, 46 and 64-78 UNDER 35 U.S.C. § 103

The Examiner rejected Claims 45, 46 and 64-78 under 35 U.S.C. § 103 as being obvious over the Gaffney reference. According to the Examiner, it would have been obvious to use the known variable resistive layer as a substitute for the piezoelectric layer described in Gaffney. Applicant respectfully submits that the claims as previously pending are patentably distinguished over the Gaffney reference, the other cited references or any combination thereof.

Claims 45 and 46

While applicant believes that pending Claims 45 and 46 are patentable, Applicant has cancelled claims 47 and 48 without prejudice.

Claims 64

Focusing on Claim 64 and the embodiment shown in FIG. 2, a system for generating an image of a relief object comprises an electroluminescent device having an electrode, a variable resistive layer being proximate to one surface of said electroluminescent device, said variable resistive layer being comprised of conductive particles dispersed through a non-

Appl. No. : 09/456,770
Filed : December 7, 1999

conductive medium, a flexible electrode substantially covering a surface of said variable resistive layer and an electrical current source.

In this claim, the variable resistive layer comprises conductive particles dispersed through a non-conductive medium. The patent application explains that examples of such a variable resistive layers are described in U.S. Patent Nos. 5,209,967 and 4,624,798.

The Gaffney reference, in contrast, discloses the use of a peizoresistive layer for a pressure transducer. The pressure transducer displays whether the amount of pressure exceeds a particular amount. Thus, the Gaffney reference does not disclose or suggest that the pressure transducer can be used as a relief object generator that illustrates, for example, a person's fingerprint. Indeed, Gaffney does not provide any suggestion whatsoever to use the pressure transducer to enhance the image of a relief object such as the ridges and lines of a fingerprint. Furthermore, Gaffney does not suggest or teach that the resolution of the pressure transducer would even be capable of fingerprint imaging.

Even if the Gaffney reference can be cited as showing a relief object generator, which it cannot, the Gaffney reference fails to disclose a variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium. The Examiner, however, asserts that it would have been obvious to use any known variable resistive layer for that of the Gaffney reference. The Examiner, however, has not established that the ordinary knowledge of those skilled in the art would have used the Gaffney reference to build a relief object generator. Furthermore, the Examiner has not established that one of ordinary knowledge would have then combined variable resistive layers of conductive particles dispersed in a non-conductive medium to create the claimed relief object generator.

Section 2143 of the M.P.E.P. states that to establish prima facie obviousness three requirements must be met:

"To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure."

Appl. No. : 09/456,770
Filed : December 7, 1999

In the present case, the Gaffney reference does not teach or suggest a relief object generator let alone a relief object generator having a variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium. Thus, there is no suggestion or motivation to combine the Gaffney reference with other types of variable resistive layers used for relief object generation. Also, because neither the Gaffney reference, nor any other cited reference, teaches teach or suggests a variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium, the Examiner has not provided prior art the teaches all the claim limitations.

Rather, it appears that the Examiner has impermissibly used hindsight derived from the teachings in the present application, and not the teachings of the prior art, to reject Claim 64. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) (holding the Board impermissibly used hindsight in determining obviousness); See also, M.P.E.P., Sect. 2145, part X.A. In Dembiczak, the Federal Circuit reiterated that a determination of obviousness cannot simply rely on the inventor's disclosure as a "blueprint" without evidence of a suggestion, teaching or motivation in the prior art. Dembiczak, 175 F.3d 994, 999. Also, according to M.P.E.P. Section 706.02(j), "[t]he teaching and suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on applicant's disclosure." (emphasis added).

Applicant therefore respectfully submits that Claim 64 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 64.

Claims 65-77

Claims 65-78 which depend from Claim 64, are believed to be patentable for the same reasons articulated above with respect to Claim 64, and because of the additional features recited therein.

Claim 78

Focusing on Claim 78 and the embodiment shown in FIG. 2, a device for generating an image of a relief object comprises a flexible electrode, a dielectric layer, a variable resistive layer between said flexible electrode and said dielectric layer, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium, a second electrode, a light emitting layer between said dielectric layer and said second electrode, said light emitting layer containing light emitting particles, said light emitting layer

Appl. No. : 09/456,770
Filed : December 7, 1999

being interposed between said second electrode and said dielectric layer; and an electrical current source having first and second leads.

The structure of the device of Claim 78 has a dielectric layer wherein the light emitting layer is interposed between the second electrode and the dielectric layer. The Gaffney reference fails to disclose any dielectric layer that is located near the light emitting layer. Even if the variable resistive layers disclosed in the patent application could be combined with the Gaffney reference, the combination still would not teach the use of a dielectric layer that is placed such that the light emitting layer is located between the dielectric layer and the second electrode.

Also, for the reasons set forth above with respect to Claim 64, the prior art does not disclose or teach the use of a variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium.

Applicant therefore respectfully submits that Claim 78 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 78.

REJECTION OF CLAIMS 49-63 and 79-95 UNDER 35 U.S.C. § 103

The Examiner rejected Claims 49-63 and 79-95 under 35 U.S.C. § 103 as being obvious over the Derwent abstracts XP-002080144 and XP-002080115 and the Abstract of the Japanese Patent 02126381. According to the Examiner, the three references teach the basic disclosed invention.

Claims 45 and 46

While Applicant believes that pending Claims 45 and 46 are patentable, Applicant has cancelled claims 45 and 46 without prejudice.

Claim 79

Focusing on Claim 79 and the embodiment shown in FIG. 2, a device for generating an image of a relief object comprises a flexible electrode; a dielectric layer in which light emitting particles are dispersed; a variable resistive layer between said flexible electrode and said dielectric layer, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium, a second electrode, and an electrical current source having first and second leads.

For the reasons set forth above with respect to Claim 64, none of the prior art discloses or teaches the use of a variable resistive layer being comprised of conductive

Appl. No. : 09/456,770
Filed : December 7, 1999

particles dispersed through a non-conductive medium Applicant therefore respectfully submits that Claim 79 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 79.

Claim 80

Focusing on Claim 80 a system for generating an image of a relief object comprises an electroluminescent device having an electrode and configured as an organic electroluminescent device, an electrical current source a variable resistive layer being proximate to said organic electroluminescent device, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium, and said electrical current source being a direct current source having one lead coupled to said electrode of said organic device and a second lead exposed at a surface of said flexible electrode.

None of the prior art references appear to disclose the use of an organic electroluminescent device. The Examiner, however, asserts that the use of an organic electroluminescent device would have been obvious. The Examiner, however, has not provided any references that would indicate the obviousness of such a combination.

Because the Examiner has failed to make the necessary showing that the ordinary knowledge of those skilled in the art would have used the claimed organic electroluminescent material, the Examiner has not provided an adequate teaching, suggestion, or motivation to reject this claim based on the ordinary knowledge of those skilled in the art. Therefore, the Examiner appears to impermissibly use hindsight derived from the teachings of the present application, rather than the teachings of the prior art or the ordinary knowledge of those skilled in the art, to reject Claim 80.

With respect to the variable resistive layer limitation being comprised of conductive particles dispersed through a non-conductive medium, Applicant respectfully submits that as explained with respect to Claim 64, the variable resistive layer comprising conductive particles dispersed through a non-conductive medium is patentably distinguished over the cited references.

Finally with respect to the direct current limitation, none of the references appear to disclose the use of a direct current source. Thus, the Examiner has failed to make the necessary showing that the ordinary knowledge of those skilled in the art would have used a direct current source. Instead, the Examiner appears to impermissibly use hindsight derived

Appl. No. : 09/456,770
Filed : December 7, 1999

from the teachings of the present application, rather than the teachings of the prior art to reject Claim 80.

Applicant therefore respectfully submits that Claim 80 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 80.

Claim 81

Focusing on Claim 81, a method for imaging a relief object comprises coupling an electrode of an electroluminescent device to a current source; contacting a relief object to an exposed surface of said electroluminescent device; locating a variable resistive layer adjacent said exposed surface of said electroluminescent device; substantially covering said variable resistive layer with a flexible electrode; and coupling said current source to said flexible electrode rather than said relief object so that said contacting step contacts said relief object with said flexible electrode so that pressure from ridges and valleys of said relief object generate relatively low and high resistance conductive paths through said variable resistive layer whereby said current from said current source is provided through said variable resistive layer at different magnitudes correspondence to said ridges and valleys of said relief object and said different currents cause said electroluminescent device to generate said image of said relief object.

Neither the Derwent abstracts XP-002080144 and XP-002080115 nor the Abstract of the Japanese patent 02126381 disclose coupling the current source to a flexible electrode rather than a relief object.

Even if the Examiner were to combine these references with the Gaffney reference, the combination of references would not teach the claimed invention. As stated with respect to Claim 64, the Gaffney reference discloses the use of a piezoresistive pressure transducer, not a relief object image generator. The pressure transducer simply displays whether the amount of pressure exceeds a particular amount. Gaffney does not disclose or suggest that the pressure transducer can be used as a relief object generator that illustrates, for example, a person's fingerprint. Indeed, Gaffney does not provide any suggestion whatsoever to use the pressure transducer to enhance the image of a relief object such as the ridges and lines of a fingerprint. Furthermore, Gaffney does not suggest or teach that the resolution of the pressure transducer would even be capable for fingerprint imaging.

Thus, none of the references teach or suggest the use of a flexible conductor that generates different currents which cause said electroluminescent device to generate an

Appl. No. : 09/456,770
Filed : December 7, 1999

image of a relief object. Applicant therefore respectfully submits that Claim 81 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 81.

Claim 82

Focusing on Claims 82, a system for generating an image of a relief object comprises an electroluminescent device having a transparent electrode layer and a dielectric layer receiving dispersed light emitting particles and substantially covering said transparent electrode layer; and an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device.

The Derwent abstracts XP-002080144 and XP-002080115 define the light emitting layer as a "luminophore" layer without any further explanation. The Abstract of the Japanese Patent 02126381 is completely silent about any details of the light emitting layer.

Thus, none of the cited references disclose the improvement of using a dielectric layer receiving dispersed light emitting particles. As discussed above, to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981 (CCPA 1974); M.P.E.P., Sect. 2143.03 and 706.02(j). In the present case, the cited references do not teach or suggest the use of a dielectric layer or dielectric layer with dispersed light emitting particles. Because none of the references teach or suggest the claimed invention, the Examiner impermissibly uses hindsight derived from the teachings in the present application, and not the teachings of the prior art, to reject Claim 82.

In view of the foregoing remarks, Applicant respectfully requests the Examiner to withdraw the rejection of Claim 82.

Claims 83-89

Claims 83-89 which depend from Claim 82, are believed to be patentable for the same reasons articulated above with respect to Claim 82, and because of the additional features recited therein.

Claim 90

Focusing on Claim 90, a system for generating an image of a relief object comprises an organic electroluminescent device having a transparent electrode as an anode, said transparent anode having a thin, sublimed molecular film deposited thereon; and an electrical

Appl. No. : 09/456,770
Filed : December 7, 1999

current source, said electrical current source having one lead coupled to said transparent anode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device.

The Derwent abstracts XP-002080144 and XP-002080115 define the light emitting layer as a "luminophore" layer without any further explanation. The Abstract of the Japanese Patent 02126381 is completely silent about any details of the light emitting layer.

Thus, none of the cited references disclose the improvement of using an organic electroluminescent device. Furthermore, none of the cited references discuss having a transparent anode having a thin, sublimed molecular film deposited thereon. Thus, even if the cited references can be combined, they do not teach the claimed limitations.

As discussed above, to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981 (CCPA 1974); M.P.E.P., Sect. 2143.03 and 706.02(j). In the present case, the cited references do not teach or suggest either an organic electroluminescent device, or a transparent anode having a thin, sublimed molecular film deposited thereon. Because none of the references teach or suggest the claimed invention, the Examiner impermissibly uses hindsight derived from the teachings in the present application, and not the teachings of the prior art, to reject Claim 90. In view of the foregoing remarks, Applicant respectfully requests the Examiner to withdraw the rejection of Claim 82.

Claims 91-94

Claims 91-94 which depend from Claim 90, are believed to be patentable for the same reasons articulated above with respect to Claim 90, and because of the additional features recited therein.

Claim 95

Focusing on Claim 95, a system for generating an image of a relief object comprises an electroluminescent device having an electrode, an electrical current source, and a one-to-one sensor array located such that said generated light is sensed by said one-to-one sensor array.

Applicant submits that Claim 95 is not anticipated by Derwent abstracts XP-002080114, XP-002080115, and Abstract of Japanese Patent 02126381. Only Japanese Patent 02126381 appears to disclose a system that has a lens and a CCD sensor located below the structure that includes the light emitting layer. Unlike the system of Claim 95,

Appl. No. : 09/456,770
Filed : December 7, 1999

however, the lens and the CCD sensor do not form a one-to-one sensor array. The references, therefore, fail to disclose a system having a one-to-one sensor array located proximate the electroluminescent device.

The Examiner has failed to establish a prima facie obviousness of a claimed invention, because none of the references either alone or in combination suggest or teach all the claim limitations. In re Royka, 490 F.2d 981 (CCPA 1974); M.P.E.P., Sect. 2143.03 and 706.02(j). In the present case, none of the cited references teach the use of a one-to-one sensor array located proximate the electroluminescent device. In view of the foregoing remarks, Applicant respectfully requests the Examiner to withdraw the rejection of Claim 95.

Claim 96

Claim 96 which depends from Claim 95, is believed to be patentable for the same reasons articulated above with respect to Claim 95, and because of the additional features recited therein.

REQUEST FOR TELEPHONE INTERVIEW

Pursuant to M.P.E.P. § 713.01, in order to expedite prosecution of this application, Applicant's undersigned attorney of record hereby formally requests a telephone interview with the Examiner as soon as the Examiner has considered the effect of the arguments presented above. Applicant's attorney can be reached at (949) 721-2998 or at the number listed below.

CORRESPONDENCE

Applicant respectfully notes that Applicant filed a Power of Attorney on March 13, 2000. On March 22, 2000 the Patent Office mailed the attached Notice Regarding Power of Attorney. Unfortunately, the Office Action dated November 22, 2000 was mailed to Applicant's previous counsel. Therefore, Applicant respectfully requests that future correspondence be directed to Knobbe, Martens, Olson and Bear as stated in the attached Notice Regarding Power of Attorney.

CONCLUSION

In view of the forgoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain to be resolved, the Examiner is cordially invited to contact the undersigned such that any

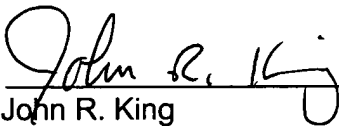
Appl. No. : 09/456,770
Filed : December 7, 1999

remaining issues may be promptly resolved. Also, please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: May 22, 2001

By: 
John R. King
Registration No. 34,362
Attorney of Record
620 Newport Center Drive
Sixteenth Floor
Newport Beach, CA 92660
(949) 760-0404

H:\DOCS\WRK\WRK-5057.DOC:sb



Version With Markings to Show Changes Made

[45] 64. A system for generating an image of a relief object comprising:
an electroluminescent device having an electrode;
a variable resistive layer being proximate to one surface of said electroluminescent device, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium;
a flexible electrode substantially covering a surface of said variable resistive layer;
an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object contacting said flexible electrode so that current coupled from said current source to said flexible electrode is strongly coupled through a low resistance path through said variable resistive layer to said electroluminescent device by ridges of said relief object and weakly coupled through a high resistance path through said variable resistive layer to said electroluminescent device by valleys of said relief object whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said ridges of said relief object and less intense light is generated by areas of said electroluminescent device weakly coupled to said current from valleys of said relief object to form an image of the relief object.

[46] 65. The system of Claim [45] 64, wherein said electroluminescent device is an organic electroluminescent device.

[47] 66. The system of Claim [45] 64, wherein said electroluminescent device is an inorganic electroluminescent device.

[48] 67. The system of Claim [45] 64, further comprising:
a sensor array; and
optical elements interposed between said sensor array and said electroluminescent device, said optical elements for focusing said generated light on said sensor array.

[49] 68. The system of Claim [45] 64, further comprising:
a one-to-one sensor array located proximate said electroluminescent device so that said generated light is sensed by said one-to-one sensor array.

Appl. No. : 09/456,770
Filed : December 7, 1999

[50] 69. The system of Claim [48] 67, wherein said sensor array is an integrated circuit.

[51] 70. The system of Claim [49] 68, wherein said one-to-one sensor array is amorphous silicon on glass.

[52] 71. The system of Claim [47] 66, said inorganic electroluminescent device further comprising:

a transparent electrode layer;

a dielectric layer;

a light emitting layer containing light emitting particles, said light emitting layer being interposed between said transparent electrode and said dielectric layer so that a first surface of said transparent electrode and a first surface of said dielectric layer are proximate said light emitting layer; and

said current supply source is an alternating current source.

[53] 72. The device of Claim [46] 65, said organic electroluminescent device further comprising:

a thin, sublimed molecular film; and

said electrode being a transport anode on which said thin, sublimed molecular film is deposited and to which said one lead of said electrical current source is coupled.

[54] 73. The device of Claim [53] 72, said thin, sublimed molecular film being tris(8-quinolinolato) aluminum (III).

[55] 74. The device of Claim [46] 65, said organic electroluminescent device further comprising:

a light emitting polymer; and

said electrode being a transparent anode on which said light emitting polymer is deposited and to which said one leaf of said electrical current source is coupled.

[56] 75. The device of Claim [55] 74, said light emitting polymer being of the group of poly(p-phenylene vinylene), soluble polythiophene derivatives, or polyanilene.

[57] 76. The devices of Claim [55] 74, said transparent anode being comprised of a transparent base substrate coated with indium tin oxide.

[58] 77. The device of Claim [55] 74, said current source being a direct current source having one lead coupled to said transparent anode of said organic device and a second lead exposed at a surface of said flexible electrode so that a localized pressure gradient generated by a portion of a relief object contacting said flexible electrode forms a conductive path through said variable resistive layer which corresponds to said localized pressure gradient whereby said current flows from said direct current source and flexible electrode through said variable resistive layer to said transparent anode of said organic electroluminescent device in correspondence with said localized pressure gradient to generate a light image of said relief object.

[59] 78. A device for generating an image of a relief object comprising:
a flexible electrode;
a dielectric layer;
a variable resistive layer between said flexible electrode and said dielectric layer, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium;
a second electrode;
a light emitting layer between said dielectric layer and said second electrode, said light emitting layer containing light emitting particles, said light emitting layer being interposed between said second electrode and said dielectric layer; and
an electrical current source having first and second leads, said first lead of said electrical current source being coupled to said second electrode and said second lead of said electrical current source being coupled to said flexible electrode so that a localized pressure gradient generated by a portion of a relief object contacting said flexible electrode forms a conductive path through said variable resistive layer which corresponds to said localized pressure gradient whereby said current flows from said flexible electrode through said variable resistive layer, dielectric layer and light emitting particles to said second electrode in correspondence with said localized pressure gradient to generate a light image of said relief object.

[60] 79. A device for generating an image of a relief object comprising:

- a flexible electrode;
- a dielectric layer in which light emitting particles are dispersed;
- a variable resistive layer between said flexible electrode and said dielectric layer, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium;
- a second electrode; and
- an electrical current source having first and second leads, said first lead of said electrical current source being coupled to said second electrode and said second lead of said electrical current source being coupled to said flexible electrode so that a localized pressure gradient generated by a portion of a relief object contacting said flexible electrode forms a conductive path through said variable resistive layer which corresponds to said localized pressure gradient whereby said current flows from said flexible electrode through said variable resistive layer, dielectric layer and light emitting particles to said electrode in correspondence with said localized pressure gradient to generate a light image of said relief object.

[61] 80. A system for generating an image of a relief object comprising:

- an electroluminescent device having an electrode and configured as an organic electroluminescent device;
- an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device so that current coupled from said current source to said relief object is strongly coupled to said electroluminescent device by ridges of said relief object and weakly coupled to said electroluminescent device by valleys of said relief object whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said ridges of said relief object and less intense light is generated by areas of said electroluminescent device weakly coupled to said current from valleys of said relief object to form an image of the relief object;
- a variable resistive layer being proximate to said organic electroluminescent device, said variable resistive layer being comprised of conductive particles dispersed through a non-conductive medium;
- a flexible electrode that substantially covers a surface of said variable resistive layer; and
- said electrical current source being a direct current source having one lead coupled to said electrode of said organic device and a second lead exposed at a surface of said flexible electrode so that a localized pressure gradient generated by a portion of a relief object contacting said flexible electrode forms a conductive path through said variable resistive layer which corresponds to said localized pressure gradient whereby said current flows from said direct current source and flexible electrode through which said variable resistive layer to said electrode of said organic electroluminescent device in correspondence with said localized pressure gradient to generate a light image of said relief object.

[62] 81. A method for imaging a relief object comprising the steps of:
coupling an electrode of an electroluminescent device to a current source;
contacting a relief object to an exposed surface of said electroluminescent device;
coupling said current source to said relief object so that current flows from said relief object to said electroluminescent device to generate an optical image of said relief object;
locating a variable resistive layer adjacent said exposed surface of said electroluminescent device;
substantially covering said variable resistive layer with a flexible electrode; and
coupling said current source to said flexible electrode rather than said relief object so that said contacting step contacts said relief object with said flexible electrode so that pressure from ridges and valleys of said relief object generate relatively low and high resistance conductive paths through said variable resistive layer whereby said current from said current source is provided through said variable resistive layer at different magnitudes correspondence to said ridges and valleys of said relief object and said different currents cause said electroluminescent device to generate said image of said relief object.

[63] 82. A system for generating an image of a relief object comprising:
an electroluminescent device having a transparent electrode layer and a dielectric layer receiving dispersed light emitting particles and substantially covering said transparent electrode layer; and
an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device so that current coupled from said current source to said relief object is strongly coupled to said electroluminescent device by ridges of said relief object and weakly coupled to said electroluminescent device by valleys of said relief object whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said ridges of said relief object and less intense light is generated by areas of said electroluminescent device weakly coupled to said current from valleys of said relief object to form an image of the relief object.

Appl. No. : 09/456,770
Filed : December 7, 1999

[64] 83. The system of Claim [63] 82, wherein said light emitting particles are phosphor particles.

[65] 84. The system of Claim [63] 82, wherein said transparent electrode layer is one of indium tin oxide and zinc oxide aluminum.

[66] 85. The system of Claim [63] 82, wherein a surface of said electroluminescent device is concave to facilitate placement of a rounded relief object against said electroluminescent device.

[67] 86. The system of Claim [63] 82, further comprising:
a sensor array; and

optical elements interposed between said sensor array and said electroluminescent device, said optical elements for focusing said generated light on said sensor array.

[68] 87. The system of Claim [63] 82, further comprising:

a one-to-one sensor array located proximate said electroluminescent device so that said generated light is sensed by said one-to-one sensor array.

[69] 88. The system of Claim [67] 86, wherein said sensor is an integrated circuit.

[70] 89. The system of Claim [68] 87, wherein said one-to-one sensor array is amorphous silicon on glass.

[71] 90. A system for generating an image of a relief object comprising:

an organic electroluminescent device having a transparent electrode as an anode, said transparent anode having a thin, sublimed molecular film deposited thereon; and

an electrical current source, said electrical current source having one lead coupled to said transparent anode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device so that current coupled from said current source to said relief object is strongly coupled to said electroluminescent device by ridges of said relief object and weakly coupled to said electroluminescent device by valleys of said relief object whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said ridges of said relief object and less intense light is generated by areas of said

electroluminescent device weakly coupled to said current from valleys of said relief object to form an image of the relief object.

[72] 91. The device of Claim [71] 90, said thin, sublimed molecular film being tris(8-quinolinolato) aluminum (III).

[73] 92. The device of Claim [71] 90, said organic electroluminescent device further comprising a light-emitting polymer deposited on a transparent anode.

[74] 93. The device of Claim [73] 92, said light-emitting polymer being one of the group of poly (p-phenylene vinylene), soluble polythiophene derivatives, or polyanilene.

[75] 94. The device of Claim [71] 90, said transparent anode being comprised of a transparent base substrate coated with indium tin oxide.

[76] 95. A system for generating an image of a relief object comprising:

an electroluminescent device having an electrode;

an electrical current source, said electrical current source having one lead coupled to said electrode of said electroluminescent device and a second lead for coupling to a relief object in proximity to said electroluminescent device so that current coupled from said current source to said relief object is a function of a surface structure of said relief object, whereby more intense light is generated by areas of said electroluminescent device strongly coupled to said current from said relief object and less intense light is generated by areas of said electroluminescent device weakly coupled to said current from said relief object to form an image of the relief object; and

a one-to-one sensor array located such that said generated light is sensed by said one-to-one sensor array.

[77] 96. The system of Claim [76] 95, wherein the one-to-one sensor array is in direct contact with the electroluminescent device, and located on a side of the electroluminescent device opposite the relief object.